Volume 22, Issue 4

# TRIBUTARY TRIBUNE

Stories and Art by Members of the Watershed Stewards Program

Year 22, District D

## Cruising for Salmon: Cracking Open the Black Box

**By: Patrick Doughty, placed at NOAA Southwest Fisheries Science Center**

"Haul back!" came the cry over the radio as the crew of the Ocean Starr raced from their computers and mammal watching perches down to the deck to see what the sea had offered them this time. As the ocean waves rolled the boat, the cables, in a hypnotic rhythm made a slow, steady ascent to the surface carrying with them the net and any creatures that had been ensnared within. As the crane lifted the cod end out of the waves and onto the deck, there was no doubt in anyone's mind that they had finally found their quarry. The salmon were here.

With salmonid population declines posing a looming threat to the fishing industries and ecosystem health in the recent decades, a great amount of effort has gone into the research and recovery of the species. Much of the focus (including that of the WSP), however, has primarily been on the freshwater side of the salmonid life-cycle in part due to the simplicity of monitoring fish in streams.

*Story continued on page 4 >>>*

*"With so little research done on the ocean-half of the life-cycle, the ocean is essentially a black box smolts will enter and any number of adults may return from. "*

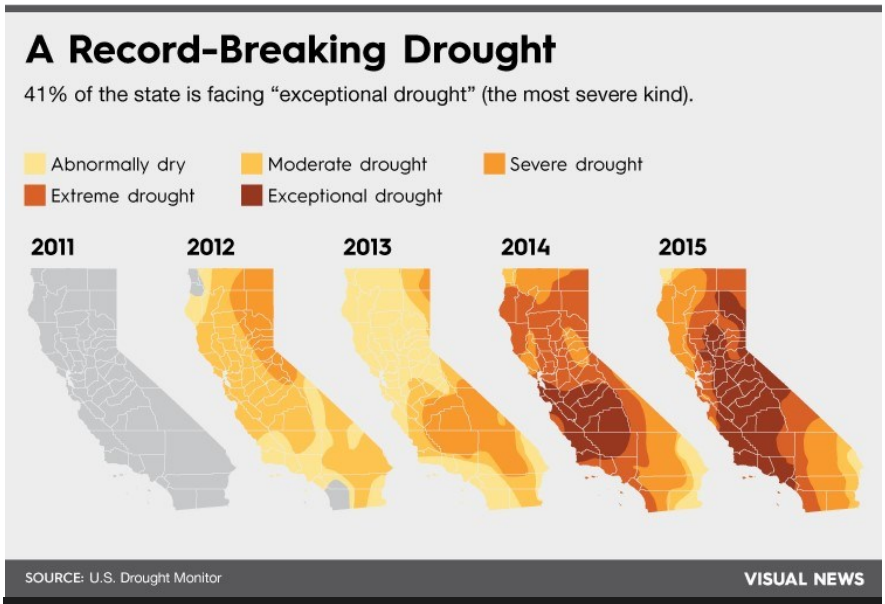
*- Patrick Doughty*

*Patrick Doughty on the Salmon Cruise with an ocean caught salmon. Photo By: Emerson Kanawi*

## In This Issue



*A program of the California Conservation Corps, WSP is one of the most productive programs for future employment in natural resources. WSP is administered by California Volunteers and sponsored by the Corporation for National and Community Service.*




*Visual image that articulates facts about the CA drought with minimal word usage. Image By: U.S. Drought Monitor*

# The Big Picture: A Case for Visual Literacy in Science

**By: Kyle Monper, Placed at the Central Coast Wetlands Group**

It is no longer true that a picture is worth a thousand words. A well thought out, simple diagram can articulate considerably more information and leave a lasting impression on the viewer. Advanced technologies in both hardware and software are making it easier for scientists to eloquently communicate vast sums of information regarding years of data and research.

But tools are useless if not used correctly. Which unfortunately occurs all too often the case with scientists seeking to display all the data from their years of research; scientists who often blunt their message with an overload of technical jargon and information. Having lived, breathed and bled over their findings it seems they assume that what are salient points to them are just as obvious to everyone else , a feeling relatable to many environmentalists who throw up their hands in exasperation towards the seeming ignorance of the masses who just don't understand the issues at hand. Well, perhaps it is time for a new approach. It is time for us to ease public understanding of the issues by telling a simple narrative about who we are, where we are, and where we might be going.

Hence the case for visual literacy among environmentalists: if we, the next generation of environmental leaders, are going to solve our salient issues of today (i.e. climate change, deforestation, ocean degradation, etc.) we must start by effectively instilling our knowledge and concerns into the public at large. We must facilitate effective communication, educating our communities until we can gather the critical mass of voices necessary to set the world upon a new, sustainable path.

Any ad marketer worth their weight can tell you about the power that images have on the human mind. Therefore, with all this information in mind, I call upon all of us to incorporate these ideas into our work. We need to apply as much thought and effort into communicating our results as we do into designing and conducting our studies. For what good is research that can't be easily understood by those who need to learn the most?

*"We need to apply as much thought and effort into communicating our results as we do into designing and conducting our studies."*

*- Kyle Monper*

*Sony trapping and moving salmon on the San Joaquin River . Photo By: Ryan Lefler*

# Restoring a River Betrayed

**By: Sony Vang, Placed at the San Joaquin River Partnership**

Chinook salmon once called the San Joaquin River home. This river is the life blood of the central valley and it flowed freely until the 1940s. Friant Dam was constructed to store water for farms and cities across Central California. The demise of the Chinook Salmon soon followed after the completion of the project. The infrastructure project severely slowed flows on the river and the salmon became endangered.

## About the Watershed Stewards Program

Since 1994, the Watershed Stewards Program (WSP) has been engaged in comprehensive, community-based, watershed restoration and education throughout coastal California.

WSP was created in 1994 by California Department of Fish and Wildlife (CDFW) biologists, educators, and the California Conservation Corps to fill critical gaps in scientific data collection, in-stream restoration, and watershed education. In collaboration with landowners, tribal communities, teachers, community members, nonprofit organizations, and government agencies, WSP works to revitalize watersheds that contain endangered and threatened salmonid species (Chinook salmon, Coho salmon, and Steelhead trout) by using state-of-the-art data collection and watershed restoration techniques. WSP also engages Members in education, outreach, and volunteer recruitment efforts to increase the capacity of partner organizations. WSP currently has Members working from the Oregon border to the Santa Monica Mountains.

**Restoring a River Betrayed, continued from page 2.**

Now more than sixty years later salmon are slowly being reintroduced into the river, but some people say it's just too late for the fish to thrive again. This article delves into restoration efforts aimed in keeping the San Joaquin River healthy so that it can continue to be the life blood of the central valley.

The San Joaquin is Central California's largest river. It supports endangered fish and wildlife species, communities, and sustains a large agricultural industry. Today, the San Joaquin River hosts a sparse, but vital, network of places where families, fishermen, and people from all over can experience and enjoy the San Joaquin River. In the 1980s, environmental organizations including the Natural Defense Council filed a lawsuit to restore river flows to a 60 - mile dry stretch of the San Joaquin River and restore the decimated salmon population. Efforts like these are essential steps for restoration.

A challenge the river currently faces is invasive plants. Non-native Salt Cedar, Scarlet Wisteria, and Arundo are spreading across the San Joaquin River banks and these invaders out compete native wildflowers, shrubs, and trees. Invasive plants displace natives and reduce suitable wildlife habitat. Planting native trees along river banks creates shading which provide suitable river temperature for many fish including the threatened Chinook Salmon.

Areas that are dominated by invasive weeds tend to erode more frequently because they lack stable root structures. Without stable root structures, storm water floods can cause severe erosion and release sediment to streams, increasing stream turbidity, and lower water quality. However, erosion is less likely to occur in areas with more diverse native plant root structures.

Habitat restoration is necessary to restoring the San Joaquin River. A healthy river allows recreation along the river's course, better health for valley residents, cleaner air, economic activity in local communities, appreciation for an agricultural way of life, education about the river's natural and cultural heritage, and enhanced natural areas for an abundance of wildlife. Healthy rivers are the life blood of our communities. Chinook salmon will be able to call San Joaquin River home once again. Become a river steward today and help keep our rivers clean.

*Native species planting along the San Joaquin River . Photo By:* ***San Joaquin River Parkway and Conservation Trust***

**Cruising for Salmon: Cracking Open the Black Box, continued from page 1**

With so little research done on the ocean half of the life-cycle, the ocean is essentially a black box smolts will enter and any number of adults may return from. By looking at the second half of the salmonid life-cycle, and understanding how ocean conditions affect salmon survival, the models for salmon survival stand to be greatly improved. Enter the Salmon Cruise.

The Salmon Cruise started small in 1998 with a couple researchers monitoring salmon from Monterrey to Ft. Ross. It has since grown in size and range to encompass the whole coastline from northern Washington to San Francisco Bay. The study has three primary objectives. First, to determine growth, feeding, spatial distribution, and migration of salmon. Second, to find patterns between these factors and the geographical and biological features along the coastline along with pelagic fish and invertebrate communities. Finally, to sample the forage base and variety at each site. To achieve these goals, the scientists aboard the Ocean Starr continuously track the ocean water quality and depth while employing a number of different nets of various sizes at key locations to sample salmon and pelagic fish, phytoplankton, and forage organisms like larval fish. Anything caught is counted, measured, and in some cases preserved for analysis back at the NOAA lab with salmon DNA and scale samples being taken to track ages and Evolutionarily Significant Units (ESUs).

As a Watershed Steward Program Member, much of my focus is on the freshwater side of the anadromous life-cycle, but I am glad to see that the research being done in the ocean can be just as important. So to those aboard the Ocean Starr I say "So long, and thanks for all the fish!"

*Salmon caught in ocean survey*
*Photo By: Patrick Doughty*


*The Ocean Starr . Photo by: Patrick Doughty*

*"As a Watershed Steward Program Member, much of my focus is on the freshwater side of the anadromous life-cycle, but I am glad to see that the research being done in the ocean can be just as important."*

*- Patrick Doughty*


*Highway drought warning sign in Southern California*
*Photo By: Dylan Hofflander*

*Low water levels leading to reduced habitat for fish. Dylan's coworker pictured doing a snorkel survey in the background.*

*Trout with flashlight spotlight on it in Southern California creek.*
*Photo By: Dylan Hoffflander*

# Serious Drought Down South

**By: Dylan Hofflander, Placed at the Santa Monica Mountains Resource Conservation District**

Southern California is classified as ten counties, starting in San Luis Obispo County and to Mexico, consists of 22.68 million people and over 60% of California's population (Wikipedia). The message is written clear on a freeway sign down in Southern California, which reads "Serious Drought." When I first saw the sign, my immediate reaction was fear. And those two words were stuck in the back of my mind the rest of that afternoon, unfortunately accompanied by grim thoughts and images of the future.

I commute to work through the canyon boulevard past the Topanga Fire Station #69. The arrival of June was immediately trailed by the "HIGH fire danger" sign. There has already been one fire in Topanga this month, luckily firefighters contained it not long after. Prime wind conditions and extreme heat have allowed fires to cover a vast amount of acreage on multiple occasions. Los Angeles, Santa Barbara, San Diego, and Kern Counties have had major burns thus far. The Kern County Eskrine fire was seen from space by NASA satellite images. The scary part is the heat isn't leaving anytime soon.

Since "El Nino" decided not to show its magical rain power to the lower half of the state, organisms are experiencing the consequences of low rainfall and high air temperatures. Two invasive species in Malibu creek, largemouth bass and red swamp crayfish, reached the same harsh ending of life. This section of the creek had a maximum depth of 2.5m only two months prior to this photo (center left). Normally many sections of the creek dry up but not at the rate we have seen this year. After a week's worth of 100°F days, the deepest section is roughly 1m and the width of the creek has shrunk to 1/3 of what it was. I, the craw-daddy crusher, actually felt bad for the hundreds of red devils as they lined the water's edge gasping for air awaiting the same fate as their cousin. I cannot believe my coworker actually snorkeled this black spa of death (you can make out his head/snorkel and feet at the downstream end in the middle left picture).

Trout are still surviving in Topanga & Malibu creeks. This photo (bottom left) was taken during our monthly snorkel survey and he's glowing from the reflection of my flashlight. I can only help but wonder what is going through his mind; What is this alien going to do to me? Why isn't the A/C working? Why is my home shrinking? As a WSP Member I am closely watching a few trout in their habitats that are decreasing in size & may have to

# A Coho Conservation Hatchery Program – Why, What, and WSP?

**By: Chris Attias, Placed at NOAA** Southwest Fisheries Science Center

On May 5th, 2016, a season's worth of effort culminated in a fintastic fish finale, a day when the final five thousand hatchery Coho salmon were released into the wild. This was the last step in the program for our fish, but to understand the Why?, What?, and WSP? of a coho conservation hatchery program we need to take a step back.

Salmon populations have been in serious decline on the west coast of the U.S. for decades and none more so than the endangered Central California Coast Evolutionarily Significant Unit (ESU) of Coho salmon. In fact, all coastal streams south of the Golden Gate have lost their wild runs of coho except, Scott and Waddell Creek in Santa Cruz County (1). In order to reverse this precipitous decline in population the NOAA National Marine Fisheries Service (NMFS) and partners have enacted a conservation hatchery program.

The conservation hatchery program safeguards the survival of this ESU of coho by raising a group of fish in captivity as "broodstock." It ensures genetic diversity by intermittently adding wild caught coho to the broodstock populations and only cross breeding salmon with low levels of relatedness. The program then supplements wild runs of salmon by spawning the broodstock and rearing the eggs for release.

As a WSP Member placed at NOAA Santa Cruz, I am lucky enough to be involved in many phases of this effort. Mostly, my site partner Patrick Doughty and I monitor coho populations in Scott Creek to help determine the effectiveness of the recovery effort. This monitoring includes redd surveys, seine netting, snorkel surveys, electrofishing, and fish trap operation. We also help by directly measuring and PIT tagging captive smolts so that their life history progress can be monitored later. Last but not least, we assist with fish releases into Scott Creek. 20,000 seaworthy smolts embarked on their maiden voyages into the wild this year, one bucket at a time (2).

The coho conservation hatchery program operated by NOAA NMFS and partners represents an intensive effort to bring back the southernmost population of Coho salmon from the brink of extinction. Will it be successful? Will our smolts survive to adulthood and return to their natal stream? I will let future WSP Members answer that question.


Works Cited:

1. "Captive broodstock program." *NOAA Fisheries Southwest Fisheries Science Center*. N.p., 56 Feb. 2015. Web. 6 June 2016. <https://swfsc.noaa.gov/textblock.aspx?Division=FED&ParentMenuId=5>
2. Youtube video of smolts released into Scott Creek: https://www.youtube.com/watch?v=kB1pku7gOTM&feature=player_embedded


*Members Patrick and Chris with WSP Alumni after assessing PITT tags on salmon in a lagoon near Scott Creek. Photo By: Joseph Kiernan*

*"20,000 seaworthy smolts embarked on their maiden voyages into the wild this year, one bucket at a time. The coho conservation hatchery program operated by NOAA NMFS and partners represents an intensive effort to bring back the southernmost population of Coho salmon from the brink of extinction.*

*- Chris Attias*

*Symmetry  Photo By: Katey Strailey*

# The Great Creek Saga

**By: Katey Strailey, Placed at the San Luis Obispo Steelhead Initiative**

T'was a wintry day when first I set boot in the creek:
Such a strange, novel experience this was for me,
Questing for steelhead redds that we soon hoped to see
Enjoying the fish, the birds, the bugs, and the trees,
Trying bravely to ignore the chill up my knees
Only to discover, in my waders, a great leak…

For many years I'd thought myself a creature of grace
The creek taught me otherwise, when a wrong step I did make
As my sole slid over stone, I knew it was a mistake
Laughter filled the air, as I filled with dismay
In front of all, my clumsiness on display
Waders flooded, and the look of shame burnt in my face

As spring renewed, time in the creek  was increased.
Deep in the wilds, tall willow loomed overhead-
Suffocating the creek, some alive and some dead
Ahead, my companion, caught in her throes
She called out to me, to vanquish these foes,
"Machete Master! Come destroy this beast!"

With each expedition, many new wounds kissed my form
At every stumble, a flower of dark blue would bloom
And with every brush of a branch, scratches did find room
Each day, sunny or not, I'd find my skin fiercely burned.
It was no matter, these were battle scars I had earned.
One would think they were granted not by creek, but by storm!

Days passed into weeks, finally my injuries started to mend,
It was not to be, I found my skin re-irritated
The oils had lain there, waiting to be activated
That familiar itch, with that burning rash,
Tried as I might, I could not help but to scratch
Visited by dearest! Darlingest! Poison oak- my old friend.

# Resurrecting a River: The Story of the San Joaquin

**By: Ryan Lefler, Placed at the San Joaquin River Partnership**

Over the past century, the Central Valley has grown into one of the world's most prolific agricultural centers. Unfortunately, this growth has led to an incredibly high demand on the watershed. In 1937, the U.S. Bureau of Reclamation (USBR) began building Friant Dam. The chief purpose of this dam was to divert water from the San Joaquin River to the developing agricultural sector in the south.

Originally, the river would have been completely terminated at Friant. However, local farmers sued the federal government to sustain flows for their crops. As a result, USBR allowed the San Joaquin River to continue to exist at 10% of its original flow. While flows from the dam continued to supply valley farmers with water, they were not nearly enough to sustain the Chinook salmon runs, which were once the second largest in California. In fact, today the San Joaquin runs dry just west of Fresno. In order to keep the area supplied with water, a canal runs 117 miles from the San Francisco Bay Delta to Mendota. Sadly, there remains a 60-mile dry spot where no salmon can run.

***Story continued on page 8 >>>***

*Friant Dam on the San Joaquin River.*
*Photo By: Ryan Lefler*

*A portion of the San Joaquin River where it runs dry just west of Fresno.*
*Photo By: Ryan Lefler*

**Resurrecting a River: The Story of the San Joaquin, continued from page 7.**

In 1988, thirteen organizations, including the National Resource Defense Council (NRDC) and the Friant Water Users Authority (FWUA) came together to sue the federal government, in order to provide sufficient fish habitat in the upper reaches of the river. After an 18-year legal battle, the resulting settlement provided for the creation of the San Joaquin River Restoration Program.

Today, the San Joaquin River is gradually being restored by a coalition of government agencies and non-profit organizations. The San Joaquin River Conservancy was established to acquire and restore habitat along the river. State and federal agencies collaborate to reintroduce Chinook salmon to the upper reaches of the river, and to study the potential for suitable habitat in this area. USBR is charged with gradually increasing flows from Friant Dam, in order to eventually restore the continuity of the river. The current drought has made restorative flows difficult to achieve, but 2015 saw a 130% increase in chinook redd production upstream of the dry stretch. This promising figure suggests that a self-sustaining population of salmon may one day be a reality. While there is still much work to do, The San Joaquin is a positive example of what is possible when many different people come together to try and save a river.

*Member Ryan setting an emergence trap for salmon in the San Joaquin River .*
*Photo By: Sony Vang*

*"The current drought has made restorative flows difficult to achieve, but 2015 saw a 130% increase in chinook redd production upstream of the dry stretch. This promising figure suggests that a self-sustaining population of salmon may one day be a reality."*

*-Ryan Lefler*

## SRF Conference 2016: Salmonid Restoration in Working Watersheds

**By: Brittany Suarez, Placed at the San Luis Obispo Steelhead Initiative**

All Year 22 WSP Members embarked on a journey to the 34th Annual Salmonid Restoration Federation (SRF) Conference in Fortuna, California from April 6-9 2016. It was an excellent opportunity to network and learn about the various recovery efforts going on to save salmonids. The theme of this year's conference was "Salmonid Restoration in Working Watersheds". The conference included day long field tours to restoration sites in the area as well as workshops and discussions on issues facing salmonids.

***Story continued on page 11 >>>***

# Assessing Riparian Condition

**By: Jenny Balmagia, Placed at the Central Coast Wetlands Group**

The California Rapid Assessment Method (CRAM) and Riparian Rapid Assessment Method (RipRAM) use a variety of metrics to quantify the condition of wetlands, such as this stream. The more complex a wetland's biotic and physical attributes are, the better its score will be. In this picture, there are multiple height classes of plants, a diversity of species and varied in-stream topography creating a fairly complex area that would likely receive a good score.

*Assessing Riparian Condition. Art By: Jenny Balmagia*


*How Sustainable Is It? Art By: Allie Watts*

# How Sustainable Is It?

**By: Allie Watts, Placed at the San Luis Obispo WSP Program Office**

Sustainability is an all-encompassing concept. Often as scientists, environmentalists, and conservation-minded individuals, we think of sustainability solely through an environmental lens. It is extremely hard not to because we are so connected to nature. Day in and day out , we work with it and in it. Many leaders, government officials, and business owners look at sustainability through solely an economic or community lens. This art piece is a reminder that we must all work together to see sustainability as all-encompassing in order to make all the work we do with the salmonid species a truly

# Save Our Watersheds

**By: Shannon Mueller, Placed at CDFW Santa Barbara**

What would nature be without her streams? Nothing to me, it seems.

Clouds burst and water drops fall from the sky onto the ground,

Where, alas, they begin their early flow.

Crisscrossing the land emptying into rivers small and grand are nature's watersheds.

Carrying the elixir of life to and from streams are on the go.

Once taken for granted, nature's gift.

Life begins and thrives in our watersheds, to be good stewards will postpone its end.

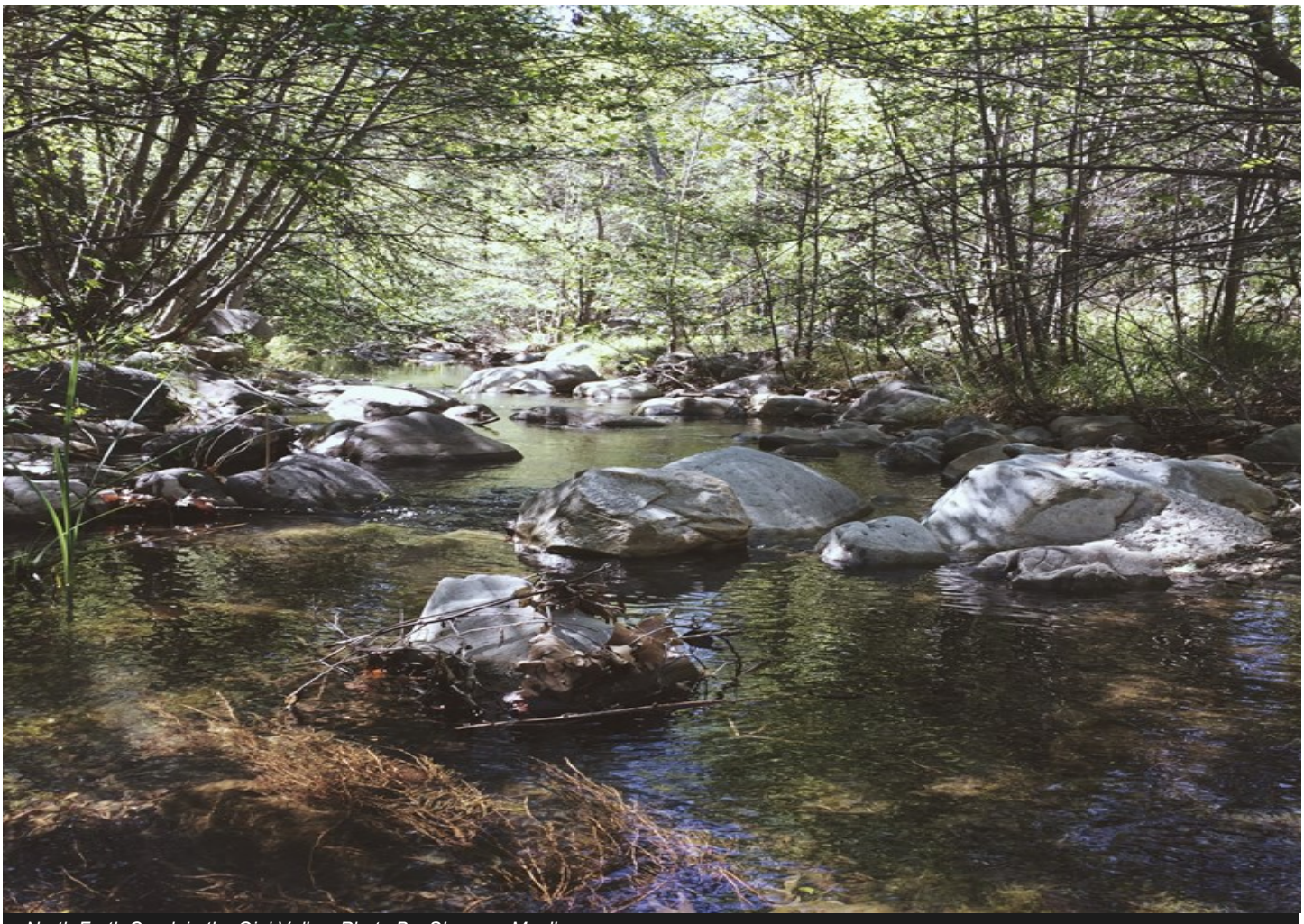
Nature's beauty needs tender care and nourishment or its future, and ours, is bleak.

Now is not the time to be meek.

Scientific surveys, research, and restoration may save our streams,

It has been a delight to work with the Watershed Stewards Program team!

*Member Shannon Mueller showing volunteers the proper techniques when planting native riparian plants.*
*Photo By: Allie Watts*



*North Forth Creek in the Ojaj Valley  Photo By: Shannon Mueller*

*Year 22 WSP Members at the SRF 2016 Conference. Photo By: Larry Notheis*

# Alumni Spotlight: Year 22 Second Year Members

## Interview By: Allie Watts
## Featuring: Caitlin Jetter, John Herrera, Chris Attias, and Patrick Doughty

**Why did you apply for a second term with WSP?**

"While in WSP, I had the pleasure to not only be part of an incredibly passionate and supportive community of individuals, but also gain a plethora of new skills in field work, data analysis, education, and outreach. With a second term, I hope to expand on my experiences with fisheries and salmonid restoration practices, and in doing so, establish a stronger knowledge and skill set for my future education and career goals. "
- Caitlin Jetter

"I applied for a second term because I wanted an opportunity to do field work with a natural resource agency. I did not have a chance to do field work professionally while still in college, and I wanted an opportunity to do biological monitoring while in a development program like AmeriCorps. As a Team Leader I was exposed to all the interesting work Members are involved in, and I too wanted the chance to gain marketable skills for future employment."
- John Herrera

*John Herrera 1st Yr. Placement - Fortuna Region I Team Leader. 2nd Yr. Placement - BLM Arcata Photo By: Amy Duarte*

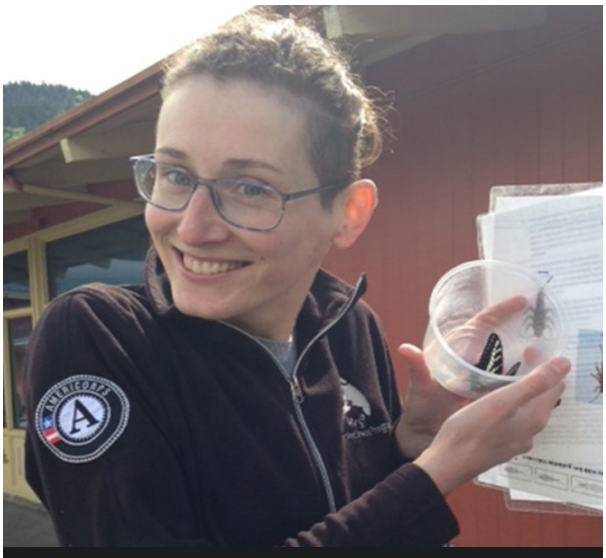
***Story continued on page 12 >>>***

**SRF Conference 2016: Salmonid Restoration in Working Watersheds, continued from page 8.**

Topics included Cannabis & Coho, Climate Change, Salmonid Health, Beaver Dam Analogues, and Life-Cycle Modeling. Conference participants learned about a variety of recovery efforts being used throughout the state.

WSP Members were not only learning and networking, they were also able to find out what other Members have been doing throughout the state. Other than the WSP Orientation and our Recognition Ceremony, the SRF Conference was the only other time that all WSP Members will be together. It was wonderful to hear about Members' difficulties and successes at their various Placement Sites.

The SRF conference truly helped to reinvigorate me for the next couple of months in WSP, giving me hope as I continue to do this work. I was reminded of the many people who have been and continue to be dedicated to this work, especially those who are WSP alumni. Meeting successful and accomplished WSP alumni inspired me, as I envisioned where all Year 22 Members will be in the future. What will our legacy be as we continue forth? Only time will tell.



*Catilin Jetter 1st Yr. Placement - San Joaquin River Partnership 2nd Yr. Placement - CDFW Yreka Photo By: Amy Duarte*

**Alumni Spotlight: Year 22Second Year Members, continued from page 11**

**How has your work with WSP inspired you to continue working in fisheries, environmental conservation, education, or led you to another field?**

"My combined experience as a Team Leader and Member at BLM Arcata has driven me to pursue a career in conservation biology and environmental education. I really enjoy biological monitoring and contributing to ongoing data sets. WSP has also helped me realize I am great at explaining natural processes and ecological interactions and I want to continue to be able to teach children outdoors. My next step is to be a research assistant doing topographic and vegetative monitoring for the Humboldt Bay Climate Ready Dunes Study. "

- John Herrera

"Working with WSP, the USFS, and NOAA NMFS has strengthened my passion for rivers, leading to an open ended journey to explore the scientific monitoring, resource management, and recreation side of watersheds!"

- Chris Attias

"My time with WSP has helped me realize that I really do enjoy working with fish and wish to continue doing so in the future. Whether those fish are salmon or not remains to be seen, as I hope to soon make the transition to studying coral reefs and the fish communities that live on them. WSP has helped me gain the experience and confidence I need to continue my journey no matter where it takes me."

- Patrick Doughty

*Chris Attias 1st Yr. Placement - USFS Orleans 2nd Year Placement - NOAA Photo By: Patrick Doughty*

*Patrick Doughty 1st Yr. Placement - MMWD 2nd Yr. Placement - NOAA Photo By: Chris Attias*

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www.ccc.ca.gov/go/wsp

## Our Mission

The Watershed Stewards Program's (WSP) mission is to conserve, restore, and enhance anadromous watersheds for future generations by linking education with high quality scientific practices.

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**Become a WSP Member! Learn more about the program and find our application at:**
**www.ccc.ca.gov/go/wsp**